Nadindas Khandwala College

Revised Syllabus
And
Question Paper Pattern
Of Course
Of
Master of Science Information Technology
(MSc IT) Programme

(Department Of IT)
Part I
Semester II

Under Autonomy

(To be implemented from Academic Year- 2017-2018)

Masters In Information Technology (MSc IT) Program
Under Choice Based Credit, Grading and Semester System
Course Structure

MSC IT

(To be implemented from Academic Year- 2017-2018)

MSC IT – SEMESTER II							
Course Code	**Course**	**Hrs. of Instruction/Week**	**Exam Duration (Hours)**	**Maximum Marks**			**Credits**
				CIE	**SEE**	**Total**	
1721PITMC	Mobile Computing	4	$2^{1/2}$ Hours	25	75	100	04
1722PITAN	Advanced Computer Networks	4	$2^{1/2}$ Hours	25	75	100	04
1723PITCC	Cloud Computing and Ubiquitous System	4	$2^{1/2}$ Hours	25	75	100	04
1724PITDB	Advanced Database Systems	4	$2^{1/2}$ Hours	25	75	100	04
1721PITPR	Mobile Computing Practical	4	2 Hours		50	50	02
1722PITPR	Advanced Computer Networks Practical	4	2 Hours		50	50	02
1723PITPR	Cloud Computing and Ubiquitous System Practical	4	2 Hours		50	50	02
1724PITPR	Advanced Database Systems Practical	4	2 Hours		50	50	02
	TOTAL	**32**					**24**

Course Code	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1721PITMC	**Mobile Computing**	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	**UNIT 1**
	Introduction: Applications, A short history of wireless communication **Wireless Transmission:** Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems. **Medium Access Control:** Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals; SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access; CDMA: Spread Aloha multiple access.
2	**UNIT 2**
	Telecommunication Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, Security, New data services; DECT: System architecture, Protocol architecture; TETRA, UMTS and IMT-2000: UMTS Basic architecture, UTRA FDD mode, UTRA TDD mode **Satellite Systems**: History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover, Examples
3	**UNIT 3**
	Broadcast Systems: Overview, Cyclic repetition of data, Digital audio broadcasting: Multimedia object transfer protocol; Digital video broadcasting **Wireless LAN:** Infrared vs. Radio transmission, Infrastructure and Ad hoc Networks, IEEE 802.11: System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management, Future development; HIPERLAN: Protocol architecture, Physical layer, Channel access control. Sublayer, Medium access control Sublayer, Information bases And Networking; Bluetooth: User scenarios, Physical layer, MAC layer, Networking. Security, Link management

4	UNIT 4
	Wireless ATM: Motivation for WATM, Wireless ATM working group, WATM services, Reference model: Example configurations, Generic reference model; Functions: Wireless mobile terminal side, Mobility supporting network side; Radio access layer: Requirements, BRAN; Handover: Handover reference model, Handover requirements, Types of IV handover, Handover scenarios, Backward handover, Forward handover; Location management: Requirements for location management, Procedures and Entities; Addressing, Mobile quality of service, Access point control protocol. **Mobile Network Layer**: Mobile IP: Goals, assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration, Tunneling and Encapsulation , Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics
5	UNIT 5
	Mobile Transport Layer: Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP. **Support for Mobility**: File systems: Consistency, Examples, World Wide Web: Hypertext transfer protocol, Hypertext markup language, Some approaches that might help wireless access, System architectures; Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script, Wireless telephony application, Examples Stacks with Wap, Mobile databases, Mobile agents

Reference Books
Description: Data Mining with Introduction to Data Science

Reference books:

1. Jochen Schiller, "Mobile communications", Addison wisely , Pearson Education Wiiliam Stallings, "Wireless Communications and Networks"
2. Rappaort, "Wireless Communications Principals and Practices"

3. YI Bing Lin , "Wireless and Mobile Network Architectures", John Wiley P. Nicopolitidis , "Wireless Networks", John Wiley
4. K Pahlavan, P. Krishnamurthy , "Principles of Wireless Networks"

5. M. Richharia , "Mobile Satellite Communication: Principles and Trends", Pearson Education

Practical (1721PITPR)

1. Develop UI with different controls on Mobile using Android.

2. Develop UI with different controls on Mobile using Windows.

3. Using buttons, radiobuttons, checkboxes on Mubile using Android / Windows.

4. Create a simple temperature converter application using Android.

5. Design a simple calculator using Windows / Android.

6. Program for simple quiz competition.

7. Program to insert and display data from database Windows / Android.

8. Program to generate Calendar using Windows / Android.

9. Design a simple to-do list using Windows/ Android.

10. Program to demonstrate simple Animation.

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1722PITAN	**Advanced Computer Networks**	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	**UNIT 1**
	TCP/IP Review, Static Routing, Dynamic Routing Protocols- Interior Gateway Protocol & Exterior Gateway Protocol
2	**UNIT 2**
	OSPF Overview and Neighbour Relationships, OSPF Topology, Routes and Convergence, OSPF Route Summarization, Filtering and Default Routing OSPF Virtual Links and Frame Relay Operations
3	**UNIT 3**
	Policy-Based Routing and IP Service Level Agreement Internet Connectivity and BGP, External BGP, BGP Path Control Network Address Translation, IP Multicast Routing, IP Version 6 IPv6 overview, IPv4 and IPv6 Coexistence, Static Point-to-Point IPv6 Tunnels, Dynamic Multipoint IPv6 Tunnels
4	**UNIT 4**
	Enterprise Campus Network Design Developing an Optimum Design for Layer 3 Advanced WAN Services Design Considerations
5	**UNIT 5**
	IPsec and SSL VPN Design, Enterprise Data Center Design SAN Design Considerations, Software defined networking (SDN)- concept, the need for a new network architecture. Architectural components, Applications.

Reference Books
Advanced Computer Networks
Reference books: 1. CCIE Professional Development Routing TCP/IP: Volume I by Jeff Doyle, Jennifer DeHaven Carroll, Cisco Press 2. CCIE Professional Development Routing TCP/IP: Volume II by Jeff Doyle, Jennifer DeHaven Carroll, Cisco Press 3. Designing Cisco Network Service Architectures ARCH Foundation Learning Guide, 3rd Edition by John Tiso, Cisco Press

Practical (1722PITPR)
1. Static routing 2. Simulationg RIP 3. Simulating OSPF 4. Simulating OSPF with STUB AREA,NSSA, Restricting LSA's 5. Simulating BGP 6. Simulating Routing Redistributions 7. Simulating IBGP 8. Simulating EBGP 9. Configuring IP Multicast Routing 10. Design Data Centre 11. Design Remote Access VPNs

Course Code	Course	Hrs. of Instruction/Week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1723PITCC	Cloud Computing and Ubiquitous System	3	2 1/2 Hours	25	75	100	4

Sr. No.	Modules / Units
1	**UNIT 1**
	Distributed System Models and Enabling Technologies: Scalable Computing Service over the Internet: The Age of Internet Computing, scalable computing Trends and New Paradigms, Internet of Things and Cyber-Physical Systems. System Models for Distributed and Cloud Computing: Clusters of Cooperative Computers, Grid Computing Infrastructures, Peer-to-Peer Network Families, Cloud Computing over the Internet. Software Environments for Distributed Systems and Clouds: Service-Oriented Architecture (SOA), Trends towards Distributed Operating Systems, Parallel and Distributed Programming Models. Performance, Security, and Energy-Efficiency: Performance Metrics and Scalability Analysis, Fault-Tolerance and System Availability, Network Threats and Data Integrity, Energy-Efficiency in Distributed Computing.
2	**UNIT 2**
	Computer Clusters for scalable parallel computing: Clustering for massive parallelism: Cluster Development Trends, Design Objective of Computer Clusters, Fundamental Cluster Design issues. Virtual machines and Virtualization of clusters and Data centers: Implementation levels of virtualization: levels of virtualization Implementation, VMM Design requirements and providers, Virtualization support at the OS level, Middleware Support for Virtualization. Cloud Platform Architecture over Virtualized Data Centers: Cloud computing and Service Models: Public, Private, and Hybrid Clouds, Cloud Ecosystem and Enabling Technologies, Infrastructure-as- a-Service (IaaS), Platform- and Software-as-a- Service (Paas, SaaS). Architectural Design of Compute and Storage Clouds: A Generic Cloud Architecture Design, Layered Cloud Architectural development, Virtualization Support and Disaster Recovery, Architectural Design Challenges

3	UNIT 3
	Public Cloud Platforms: GAE, AWS, and Azure: Public Clouds and Service Offerings, Google App Engine (GAE), Amazon Web Service (AWS), Microsoft Windows Azure. Inter -cloud Resource Management: Extended Cloud Computing Services, Resource Provisioning and Platform Deployment, Virtual Machine Creation and Management. Cloud Security and Trust management: Cloud Security Defense Strategies, Distributed Intrusion/Anomaly Detection, Data and Software Protection Techniques. Cloud Programming and Software Environments: Features of Cloud and Grid Platforms: Cloud Capabilities and Platform Features, Traditional Features Common To Grids and Clouds, Data Features and Databases, Programming and Runtime Support. Parallel and Distributed Programming Paradigms: Parallel Computing and Programming Paradigms, MapReduce, Twister and Iterative MapReduce, Hadoop Library from Apache
4	UNIT 4
	Programming Support of Google App Engine: Programming the Google App Engine, Google File System (GFS), Bigtable, Google's NOSQL system, Chubby, Google's Distributed Lock service. Programming on Amazon AWS and Microsoft Azure: Programming on IV Amazon EC2, Amazon Simple Storage Service S3, Amazon Elastic Block Store EBS and SimpleDB, Microsoft Azure programming support. Emerging Cloud Software Environments: Open Source Eucalyptus and Nimbus, OpenNebula, Sector/Sphere, and OpenStack, Manjrasoft Aneka Cloud and Appliances
5	UNIT 5
	Ubiquitous Clouds and the Internet of Things: Performance of Distributed Systems and the Cloud: Data-intensive Scalable Computing (DISC), Quality of Service in Cloud computing, Benchmarking MPI, Azure, EC2, MapReduce, and Hadoop. Online social and Professional Networking: Online Social Network Characteristics, Graph-Theoretic Analysis of Social networks, Communities and Applications of Social Networks, Facebook: The World's Largest Content-Sharing Network, Twitter for Microblogging, News and Alert Services.

Reference Books
Cloud Computing and Ubiquitous System

Reference books:

1. Kai Hwang, Jack Dongarra, Geoffrey Fox: Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, MK Publishers, 2012.
2. Michael Miller, Cloud Computing: Web-Based Applications that change the Way you work and collaborate Online, Pearson Publication, 2012.
3. John Krumm, Ubiquitous Computing Fundamentals,CRC Press.

Anthony T. Velte, Toby J. Velte, Robert Elsenpeter: Cloud Computing, A Practical Approach, McGraw Fill, 2010

Practical (1723PITPR)
1. Performing clustering in windows
2. Implementing VMWare ESXi Server
3. Implementing Xen Server
4. Developing app for Windows Azure
5. Developing app for Google App Engine
6. Implementing Open Nebula Sandbox
7. Implementing Iaas with Eucalyptus
8. Implementing Hyper-V
9. Programming in Hadoop for Map Reduce

Course Code:	Course	Hrs. of Instruction/ week	Exam Duration (Hours)	Maximum Marks			Credits
				CIE	SEE	Total	
1724PITDB	Advanced Database Systems	3	2 ½ hrs	25	75	100	4

Sr. No.	Modules / Units
1	**UNIT 1**
	The Extended Entity Relationship Model and Object Model: The ER model revisited, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.
2	**UNIT 2**
	Object-Oriented Databases: Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects; Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS
3	**UNIT 3**
	Object Relational and Extended Relational Databases: Motivation for complex data types, User defined abstract data types and structured types, Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; An overview of SQL3, Implementation issues for extended type; Systems comparison of RDBMS, OODBMS, ORDBMS
4	**UNIT 4**
	Parallel and Distributed Databases and Client-Server Architecture: Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases. An overview of Client-Server architecture

5	UNIT 5
	Databases on the Web and Semi Structured Data: Web interfaces to the Web, Overview of XML; Structure of XML data, DTD, XML Schema, XQuery, XSLT, Storage of XML data, XML applications, XML DOM, The semi structured data model, Implementation issues, Indexes for text data Enhanced Data Models for Advanced Applications: Active database concepts. Temporal database concepts.; Spatial databases, Concepts and architecture; Deductive databases and Query processing; Mobile databases, Geographic information systems, Introduction to data warehousing.

Reference Books
Advanced Database Systems

Reference books:

1. Elmasri and Navathe, "Fundamentals of Database Systems", Pearson Education

2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGrawHill

3. Korth, Silberchatz, Sudarshan , "Database System Concepts", McGraw-Hill.

Practical (1724PITPR)
1. Horizontal fragmentation of database.
2. Vertical fragmentation of database
3. Creating Replica of database.
4. Create Temporal Database.
5. Inserting and retrieving multimedia objects in database (Image / Audio /Video).
6. Implement Active database using Triggers
7. Create ORDBMS Application
8. Implement and retrieve records from a Spatial Database
9. Working with XML
10. Prolog programming(Deductive Database)

Evaluation Scheme

I. Internal Exam-40 Marks

(i) Test– 30 Marks - Duration 60 mins

It will be conducted either as a written test or using any open source learning management system such as Moodle (Modular object-oriented dynamic learning environment)Or a test based on an equivalent online course on the contents of the concerned course(subject)offered by or build using MOOC (Massive Open Online Course)platform.

(ii) 10 Marks – Presentation and active participation in routine class instructional deliveries

Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.

II. External Examination- 60 Marks

(i) Duration - 2.5 Hours.

(ii) Theory question paper pattern:-

All questions are compulsory.		
Question	Based on	Marks
Q.1	Unit I	12
Q.2	Unit II	12
Q.3	Unit III	12
Q.4	Unit IV	12
Q 5	Unit V	12

– All questions shall be compulsory with internal choice within the questions.

– Each Question may be sub-divided into sub questions as a, b, c, d & e, etc & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination – 50 marks (Duration: 2 Hours)

- Each practical course carries 50 Marks : 40 marks + 05 marks (journal)+ 05 marks(viva)

- Minimum 75% practical from each course are required to be completed and written in the journal**.**

(Certified Journal is compulsory for appearing at the time of Practical Exam)